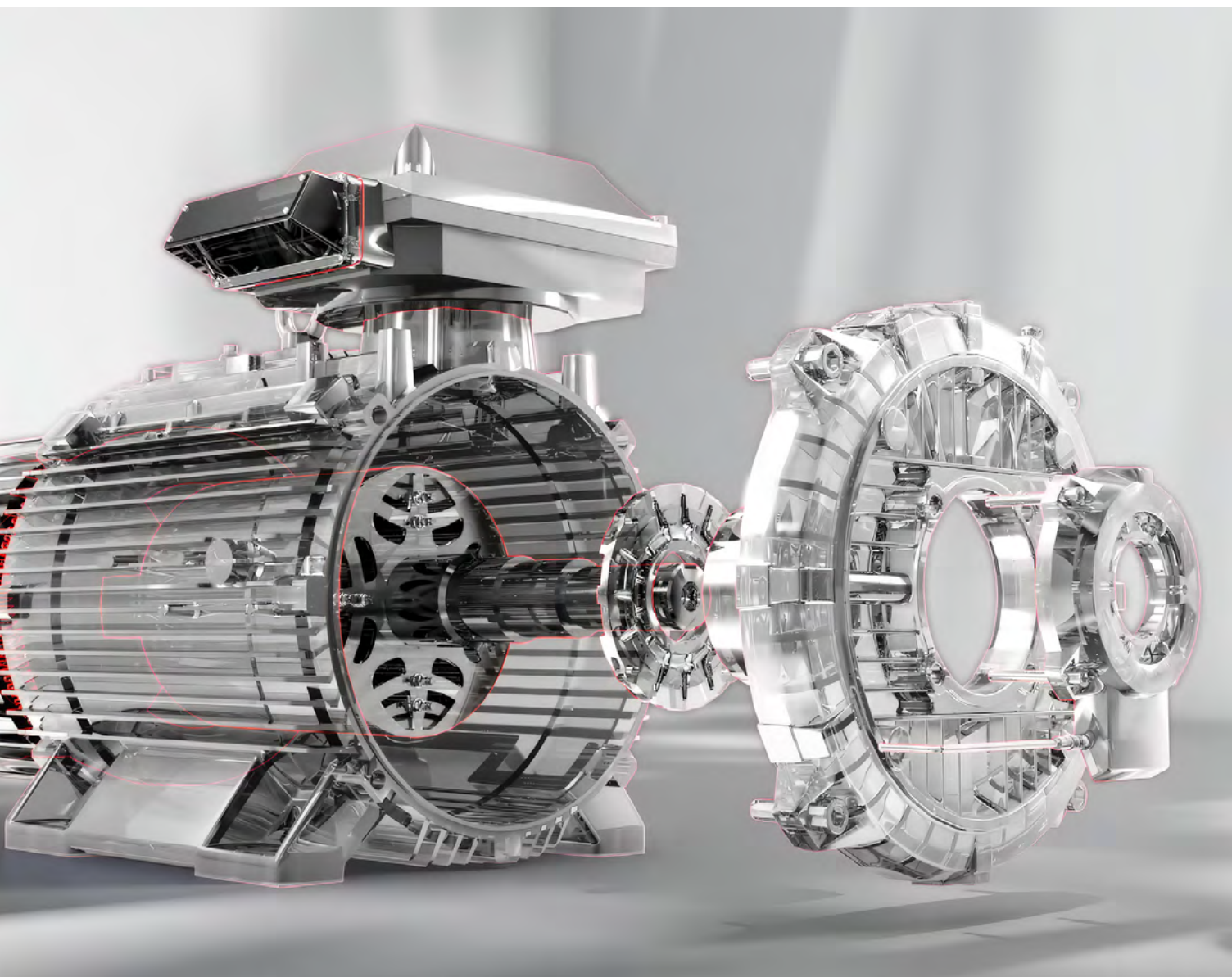




WHITE PAPER

Energy efficiency: the decisive factor

An evidence-based study of industry
priorities when choosing electric motors

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Executive summary

INTRODUCTION

According to the UN, the world's population is expected to increase from today's 8 billion to 9.7 billion by 2050.⁽¹⁾ This expansion of nearly two billion people will go hand in hand with the further growth of essential industries – food, water, concrete, metals, batteries, and so on.

These industries are already demanding more energy than ever to meet the levels of output required today: 166 exajoules, or over 46,000 TWh, by the International Energy Association (IEA)'s last calculation.⁽²⁾ For all of human history, population growth and increasing energy demands have resulted in a greater output of CO₂ and just since the Industrial Revolution in 1750, we've raised atmospheric CO₂ by 50%.⁽³⁾

If we are to stave off the threat of climate change caused by human activity, this general expansion must come with commitments to sustainability. Globally, regulatory shifts and expectations already reflect this attitude. The European Climate Law has made European climate neutrality by 2050 a legal requirement, and commitments at COP28 included doubling the global rate of energy efficiency improvements from 2% to 4% per year by 2030.⁽⁴⁾⁽⁵⁾

The case for sustainability is far from just moral. There is a mounting sense in today's industries that short-sighted cost cutting is a lost cause and does not secure long-term profitability. Total-cost-of-ownership (TCO) is the new frontier, and those businesses which prioritise it will navigate the next 25 years with not only their reputations, but their competitiveness intact.

At ABB, we believe that **energy efficiency** is the foundation of any worthwhile sustainability strategy. ABB, in collaboration with Alfa Laval, initiated the Energy Efficiency Movement in 2021 to boost energy efficiency within the industry. Industrial **electric motors**, which are the heart of practically every industrial process, are the most

obvious place to implement it, especially when paired with variable speed drives (VSD). With the installed base of electric motors set to double by 2040, it is an opportunity which will only continue to grow.⁽⁶⁾

THE ROLE OF ELECTRIC MOTORS

Energy efficiency is our ace in the hole when it comes to sustainability. We see time and again that energy efficient electric motors last longer, cost less to run, and require less maintenance.

Their omnipresence in industry means that new standard-setting for efficiency in electric motors can make an outsized impact on worldwide energy consumption. At ABB, we work tirelessly to ensure our motor designs make energy efficiency gains with every iteration, even going beyond official International Electrotechnical Commissions (IEC) standards with our IE6 Synchronous Reluctance motors (SynRM).⁽⁷⁾

But to what extent is the selection of energy efficient motors prioritized by the market, and what implications does this have for sustainability strategies going forward?

WHAT INDUSTRY SAYS

To find these answers, in 2024 we conducted a survey of 2,400 business leaders and decision makers in the machinery manufacturing, energy & power, food & beverage, and metals industries, among others. These respondents were from more than 13 countries in Europe, the Americas, and Asia. The data shows the critical role that energy efficiency now plays in the sustainability agenda for global businesses, with **91% of businesses now viewing it as the decisive factor when selecting industrial electric motors.**

This is only logical: long-term energy savings outweigh the initial investment in state-of-the-art technology. But the survey also demonstrates the added value of sustainable marketability for customer relationships and brand image. Of note, however, are key differences in cost and perception-motivated priorities between Original Equipment Manufacturers (OEMs), distributors, and end users.

Some respondents also made clear that the rapid market shift towards energy efficiency isn't without its challenges. Concerns about initial investment costs, integration hurdles, and the effects of downtime during the transition

to higher-efficiency motors persist. **41% of businesses have total-cost-of-ownership front of mind when buying a motor**; while it's on the rise, this shows that not everyone is fully on board with the TCO mindset. At ABB, addressing and assuaging these concerns is a priority which we will take forward.

With data and insights from the frontlines of various sectors, this whitepaper aims to decipher the industrial state of mind. What we have found is that energy efficiency is the name of the game – it's on almost everyone's minds. But it's now time for industry, with the help of government and investment, to set their plans in motion.

PAPER HIGHLIGHTS

- **94%** of businesses are either investing or plan to invest in increasing their organization's energy efficiency
- However, only **41%** of these businesses prioritize the total cost of ownership when purchasing new electric motors
- **61%** of business respondents recognize the importance of electric motors in achieving sustainability targets as very important
- Despite this recognition, businesses face barriers such as higher upfront costs, integration concerns, and downtime that limit investments in more energy-efficient motors
- It is reported that upgrading all currently installed industrial motor-driven systems to higher-efficiency versions could reduce worldwide electricity consumption by **up to 10%**
- Efficiency improvements in electric motor systems could help avoid nearly **3100 TWh** of electricity consumption by 2040
- ABB's IE5 SynRM motors and ACQ580 drives, for example, enabled three 20 kW pumps to achieve nearly **16 MWh** of annual energy savings and cut emissions by 7,800 kg
- Moreover, **99%** of businesses see added value in running digitally connected electric motors, especially for predictive condition monitoring
- A case study from ABB demonstrates this potential, with GSK achieving **20%** savings in pump energy costs following the installation of IE5 SynRM motors and drives



Understanding the challenge

INDUSTRY USES LOTS OF ENERGY

According to the IEA, the industrial sector in 2022 was directly responsible for emitting 9 Gt of CO₂, accounting for a quarter of global energy system CO₂ emissions. It also accounted for 37% of global energy use in the same year.⁽⁸⁾ Within that segment of overall energy use, it's estimated that roughly 70% of electricity consumed by industry is used by electric motor systems.⁽⁹⁾

This is because industrial electric motors are a ubiquitous and essential technology, with more than 300 million in operation around the globe. Every year, they turn vast amounts of generated electricity into motion in a variety of applications. The most common type, low voltage motors, account for 65% of that industrial electricity demand, powering fans, compressors, pumps, and mixers.⁽¹⁰⁾

These machines are set to work anywhere from wastewater pumps, to quarry conveyors, to confectionery mixers, to data center cooling fans. They are everywhere and make practically everything move.

NOT AS EFFICIENT AS IT COULD BE

Industrial electric motors are also using more electricity than they need to. We already predict that they will double in number by 2040, but electricity consumption itself would double even earlier – by 2030 – if industries did not enhance their energy efficiency.⁽¹¹⁾

For context, IEC standards include five distinct levels.⁽¹²⁾ Motors in the IE1 and IE2 categories meet the basic criteria to be classified as “efficient”, though in practice, they are broadly regarded as

inefficient.⁽¹³⁾ IE3 motors achieve roughly 94% efficiency, while IE4 motors have a 20% reduction in energy losses compared to IE3, reaching around 95%. IE5 motors represent the highest officially recognized efficiency level, with a further 20% reduction in energy losses achieving around 96% efficiency.

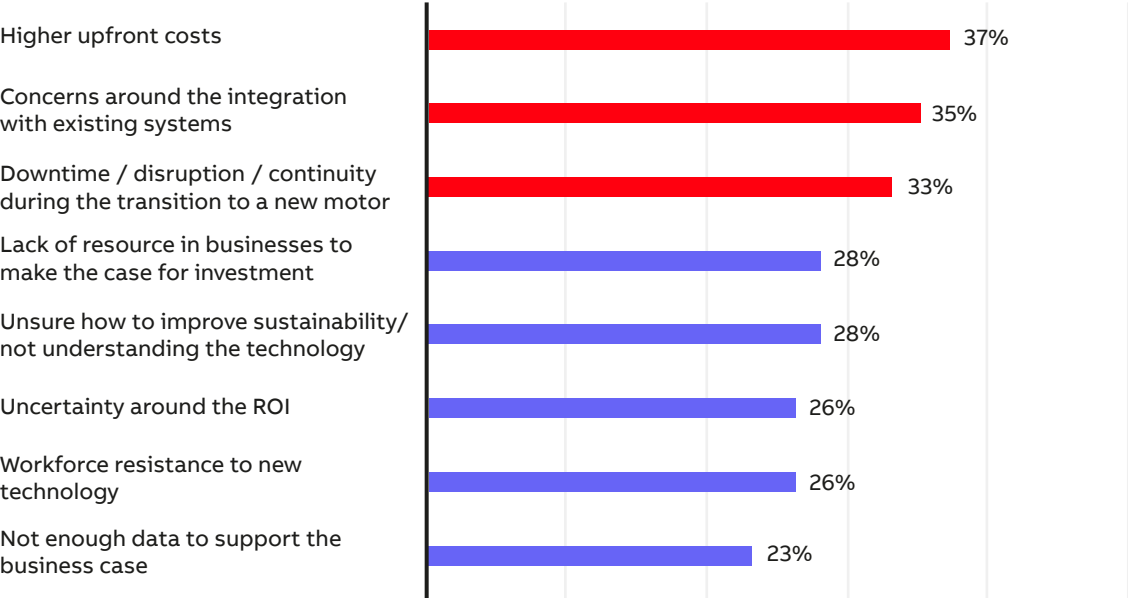
Across all voltage ranges, IE3 class motors are the most commonly mandated electric motor type covered by the IEC's standards today, and their use is supported by regulations – based on industry association recommendations – known as Minimum Energy Performance Standards (MEPS).⁽¹⁴⁾ IE3 induction motors are often the go-to choice to balance initial purchase cost with level of efficiency. The IE3 tier is also officially named “Premium Efficiency”. This is not inaccurate, but it is a highly marketable term.

Putting aside the currently installed base of IE1 and IE2 efficiency motors, which are often found where operation is low-impact and in regions still developing their efficiency regulations, it therefore makes sense that IE3 is where much of the industry has naturally settled. But there are many more gains to be made, and this is to say nothing of the fact just three out of five industrial electric motors in use globally are even covered by the minimum energy performance standards, IE1.⁽¹⁵⁾

BARRIERS TO ADOPTION

Industrial owners and operators are responding to multifaceted external pressures. Policymakers are pushing for more stringent energy efficiency standards, and customers are demanding transparency. But from boardroom to factory, there can be uncertainties that delay progress. Herein lies the challenge: adapting and thriving amid these dynamics as a business with the bottom line at stake. Our respondents cited

BARRIERS TO INVESMENT
IN ENERGY EFFICIENT MOTORS



a variety of reasons for hesitancy or pushback against swapping out or upgrading their electric motors:

Higher upfront costs (**37%**), concerns around integrating with existing systems (**35%**), and potential disruption in production capacity (**33%**) constitute the top issues holding businesses back from investing in more energy efficient motors. Higher upfront costs are also more of a barrier for higher turnover businesses – as the figure increases to **44%** for companies with a turnover of more than \$500 million – likely due to more intense scrutiny from shareholders.

Integration and continuity concerns reflect a focus from a significant portion of businesses on the indirect effects on costs, not just initial price.

This stems from businesses struggling to find the link between investment in energy efficiency and long-term savings. Feeding into this is a lack of internal resources to make a proper case for the return on investment (ROI), despite evidence of a short payback period. This alone makes **28%** of businesses reluctant to invest.⁽¹⁶⁾

Acknowledging that cost is both a barrier in the short term and driver in the long term is key. Industry-specific case studies that demonstrate the potential ROI, combined with training and education for skeptical employees and financial decision makers on the benefits of energy efficiency upgrades, are crucial to lower barriers to adoption. As we will see, applying that perceived internal pressure can be even more effective at driving immediate change than regulation.

The importance of high efficiency industrial electric motors

THE FIRST FUEL

According to the IEA, a kilowatt-hour saved has a greater impact than one generated from renewable energy sources like solar, wind, or hydropower. The IEA's Net Zero Roadmap stresses that while limiting global warming to 1.5°C by 2030 is challenging, it is achievable, and energy efficiency is seen as the quickest and most cost-effective measure to meet these targets. In fact, it's referred to as the "First Fuel".⁽¹⁷⁾

The role of industry in this roadmap is to make efficiency gains wherever possible so that we do not need to spend time and emissions extracting precious material resources, building new infrastructure, and consuming further energy to create more generation capacity that meets demand. Reducing energy demand itself should be our collective and individual mission while the energy transition occurs.

For a sense of scale, the act of just upgrading all currently installed industrial motor-driven systems to higher-efficiency versions could cut worldwide electricity consumption by up to 10 percent today.⁽¹⁸⁾ The IEA also posits that efficiency improvement measures for electric motor systems would help to avoid nearly 3100 TWh of electricity consumption by 2040, cutting industrial electricity demand growth by nearly half when compared to a "business as usual" scenario.⁽¹⁹⁾

WHAT DOES HIGH EFFICIENCY LOOK LIKE?

In an electric motor, ensuring high efficiency begins at the point of design. For example, synchronous reluctance technology like ABB's IE5 and IE6 SynRM combines the performance of the permanent magnet motor with the simplicity and service-friendliness of an induction motor. The

rotor has neither magnets nor winding and suffers virtually no power losses.

Variable speed drives are connected to motors to optimize their speed by regulating the flow of power. It has long been known that VSDs are key to reducing the power consumption of motors which require precise control, with typical energy savings of around 25% or even more. Combined with an already highly efficient motor, and losses could be reduced even further.

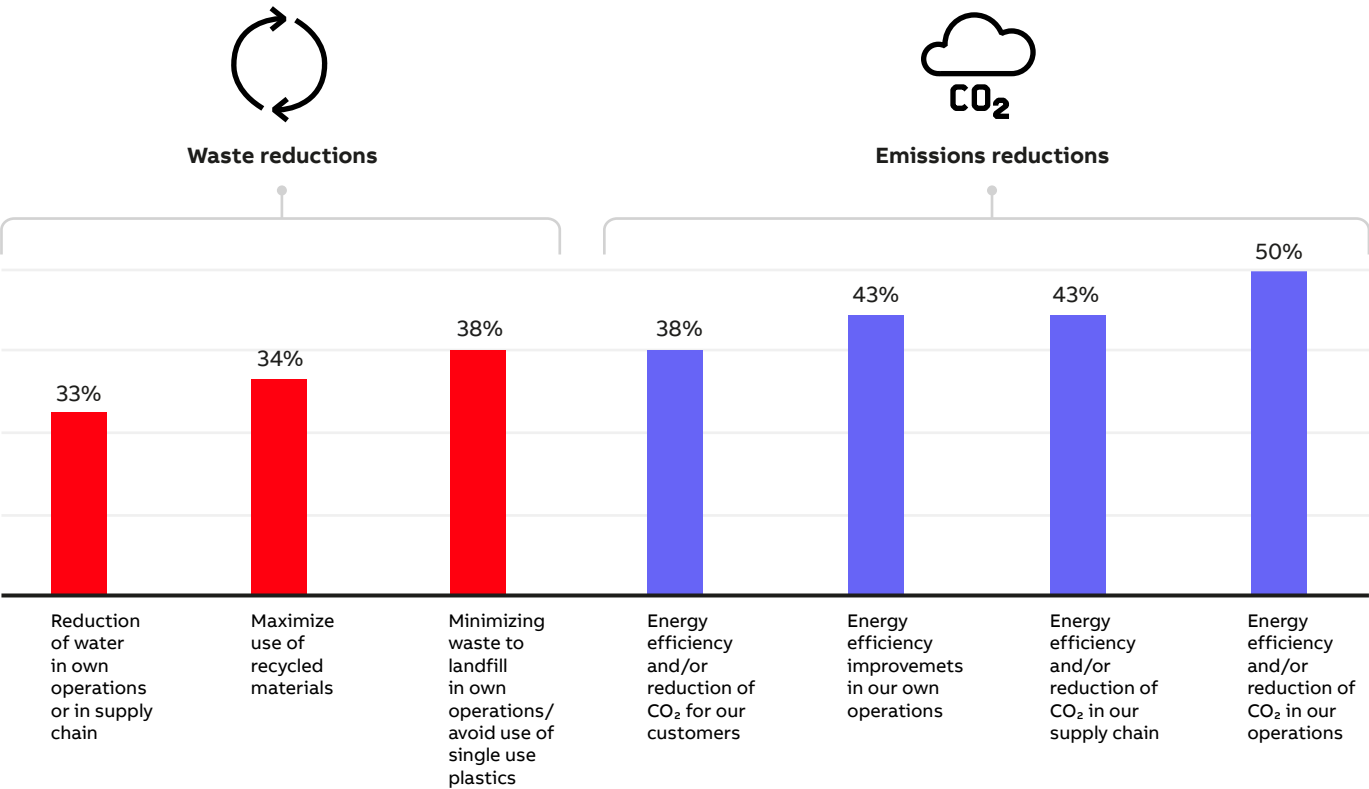
When looking specifically at the digitalization of electric motors, it's increasingly common for suppliers to utilize data insights and remote monitoring to improve their service offering. Supervisory control and data acquisition (SCADA) analytics can help operators predict maintenance issues and streamline servicing, reducing downtime while keeping components intact and as efficient as possible, for as long as possible.

ENERGY EFFICIENCY VERSUS...

But energy efficiency isn't the only sustainability criteria important to industry, and our respondents' answers reflect this. We can divide sustainability targets into two camps – reducing physical waste, and reducing gas emissions.

Recycling is a waste reduction strategy that has been encouraged and enforced by various European regulations. These include the EU Waste Framework Directive, which mandates that industrial equipment like electric motors are recycled properly (Article 11), and the Waste Electric and Electronic Equipment (WEEE) Directive, which requires the separate collection and proper treatment of WEEE and sets targets for its collection, recovery and recycling.⁽²⁰⁾⁽²¹⁾

SUSTAINABILITY TARGETS



Within the realm of recycling, ABB motors and drives are 98 percent recyclable as a given, with a takeback scheme that guarantees that non-functional and inefficient motors are recycled in an efficient way at partner recyclers.⁽²²⁾ This, however, appears to take a backseat to energy efficiency when it comes to business’ sustainability priorities. From the survey, it appears that reducing gas emissions via energy efficiency is a more prevalent target across organizations that have sustainability strategies in place.

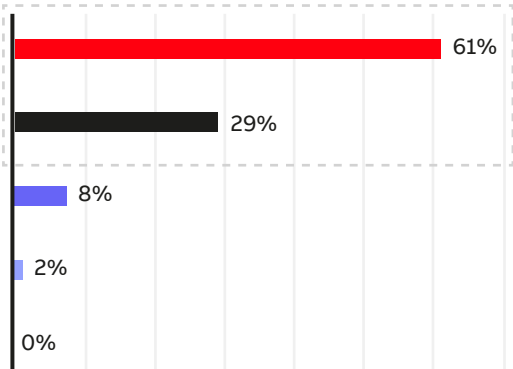
For both end users which have obligations and relationships to maintain with customers (38%), and OEMs which pursue cost and energy

efficiency in their own operations and supply chains (43–50%), electric motor efficiency is the obvious go-to solution. While recyclability cannot be discounted and should continue to be a key part of a business’ sustainability strategy, the data supports the idea that the market feels energy efficiency is more of a decisive factor when selecting motors.

In keeping with this trend, there is an almost uniform link between those who recognize that electric motors can play a key role in achieving their sustainability targets, and the importance they place on energy efficiency when making a new purchase for their plant.

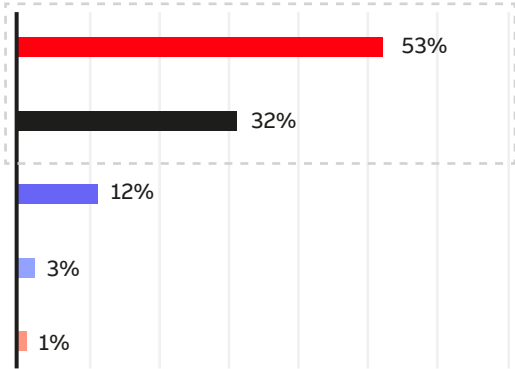
IMPORTANCE OF ELECTRIC MOTORS

In achieving sustainability targets



IMPORTANCE OF ENERGY EFFICIENCY

When selecting a new motor



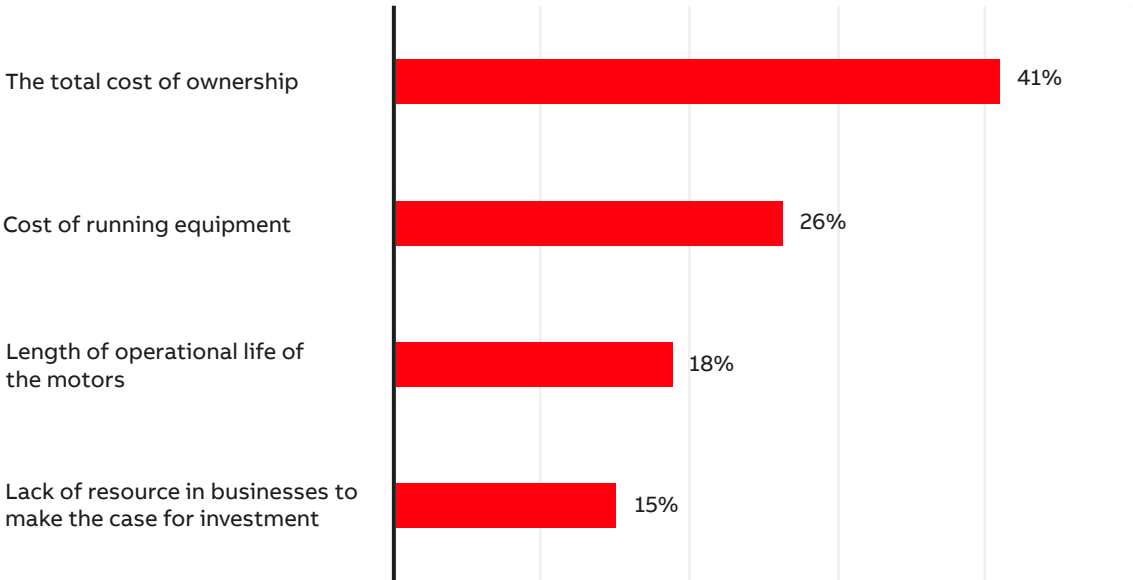
Very important Important Moderately important Slightly important Not important

TOTAL COST OF OWNERSHIP

With cost being a significant barrier, it is important to note that most businesses are now looking at TCO as the most important factor when purchasing new electric motors. Cost is a double-edged sword – despite it acting as an initial barrier, cost-related factors constitute two of the top three drivers for organizations to invest

in more energy efficient motors, also showing its role as a significant motivator. TCO means calculating the lifetime energy costs, component longevities, costs of labor and repair of a motor, and other criteria which give a full picture of its impact and value.

FACTOR IMPORTANCE WHEN PURCHASING NEW ELECTRIC MOTORS



The data shows that **41% of businesses are prioritizing TCO when it comes to purchasing new motors**. This is a heartening majority to see, as it shows that the market is moving towards long-term sustainability as the norm. However, it could be a stronger majority – the narrower short-term concerns aren't far behind. The good news is that measurable energy efficiency ROI is important to the vast majority of businesses, with **99% tracking the outcomes of their own initiatives**, so it's likely that this more compartmentalized thinking will change over time.

There is also still a significant portion of the industry laser-focused on short term costs, even if they are looking to invest in energy efficient motors. You may ask: “so what? They're still being more energy efficient, does their reasoning or payback timeline really matter?” While it is true that any increase energy efficiency is better than none, the issue with a short-term mindset is that the most efficient motor options are passed up due to higher initial costs. For example, picking an IE3 when you could have picked an IE5. TCO would help these buyers see past the initial premium and reap the benefits.

CASE STUDY

TCO IN ACTION AT A GERMAN EQUIPMENT MANUFACTURER

In 2023, Franz Eisele, a leading German manufacturer of pumps and agitators, enhanced the efficiency of its products by integrating ABB's IE5 SynRM motors and ACQ580 drives. Three 20 kW pumps using these motors saved nearly 16 MWh annually – more than the yearly consumption of an electric car – while cutting emissions by 7,800 kg. The motors qualified for Germany's 'BAFA' subsidies, which dramatically shortened the payback period to less than one month, making them a financially compelling investment.

ABB's packaged solutions simplified procurement by providing a seamlessly integrated motor and drive system, ensuring fast commissioning and optimized performance. As a trusted partner, ABB brought extensive domain expertise, particularly in water and wastewater applications. “The advantages included easy and quick handling, lower carbon emissions due to increased energy efficiency, and, of course, securing or improving profitability for our customers thanks to the high return on investment in conjunction with the BAFA subsidy program,” said Dominik Eisele, Managing Director. With a legacy spanning more than 130 years, the family-owned Franz Eisele company remains a market leader in its specialized sector.

This case study highlights the benefits of considering total cost of ownership (TCO) rather than just upfront costs. By choosing ultra-efficient motors, Eisele's customers not only reduced energy consumption and emissions but also achieve significant long-term cost savings.

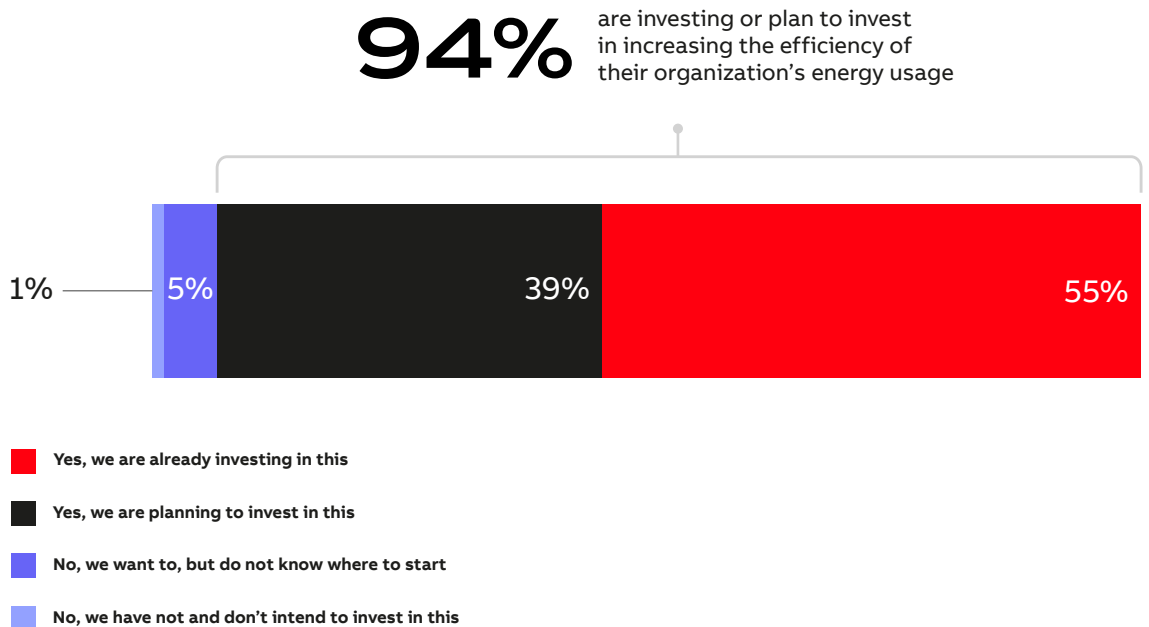
Readiness and reasoning: industry trends

WHO'S READY TO BE MORE SUSTAINABLE?

All businesses expect an ROI. The transition to a more sustainable and energy efficient market

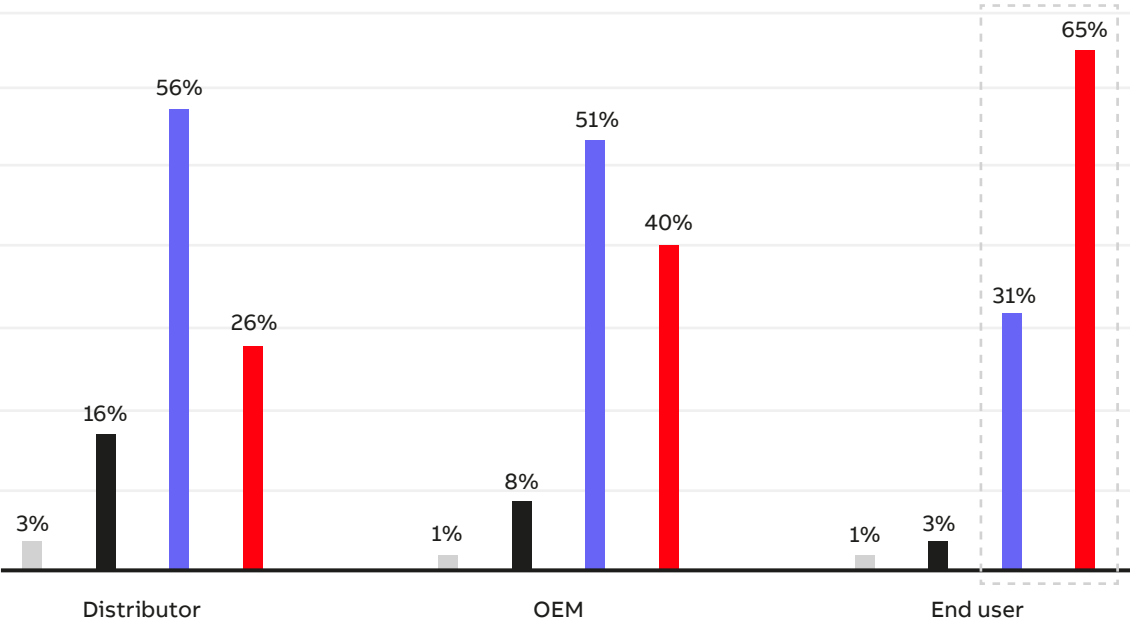
is being driven as much by businesses wanting to reduce operational costs as it is by policy and regulation. The challenge lies in convincing organizations to invest in long-term sustainability strategies when their primary goal is cost reduction, which often favors short-term solutions.

PLAN TO INVEST IN INCREASING THE EFFICIENCY OF ORGANIZATION'S ENERGY USAGE



However, while only a handful (25%) of companies have sustainability **fully** integrated into their business strategy, this is set to increase rapidly over the coming years. This is evident in the fact that an encouraging **94% of business leaders surveyed** are either currently investing or planning to invest in sustainability initiatives focused on increasing the efficiency of their energy usage.

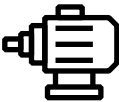
Something to note, however, is that progress on this front, and overall intention to invest, differs between end users, distributors, and OEMs. It appears that there is a significant disparity in the readiness, reasoning and methods that different business types have when approaching sustainability.



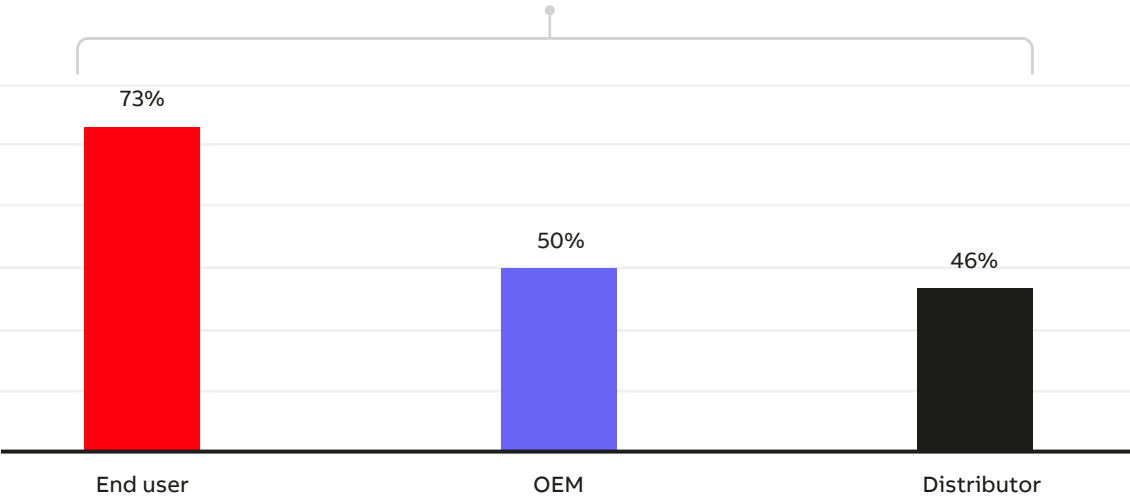
Significantly more end user businesses are **already** investing in sustainability initiatives, versus OEMs and distributors who are planning to invest. This is because proximity to the customer has an influence on the importance a business places on sustainability criteria.

End user businesses often have a direct relationship with their customers and rely

heavily on their brand image and consumer perception. Since energy efficiency is increasingly important to consumers, and companies can enhance their brand reputation by adopting energy-efficient practices and products, they are the most invested in the marketability of sustainability. Here, the objective is not cost saving, but sales uplift.



End user organizations report that energy efficient motors bring the **most** significant additional value to their product/operations

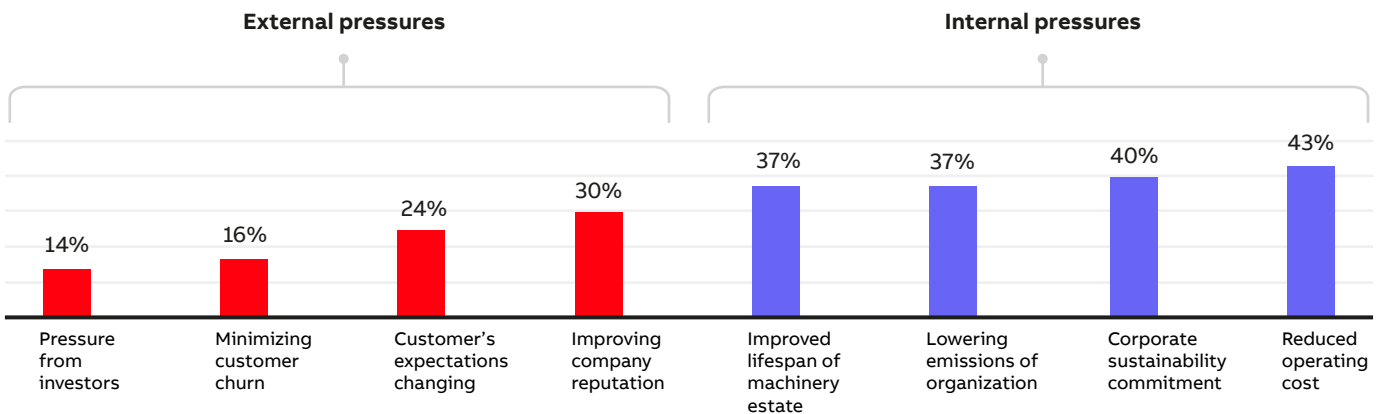


PRICE OR PERCEPTION?

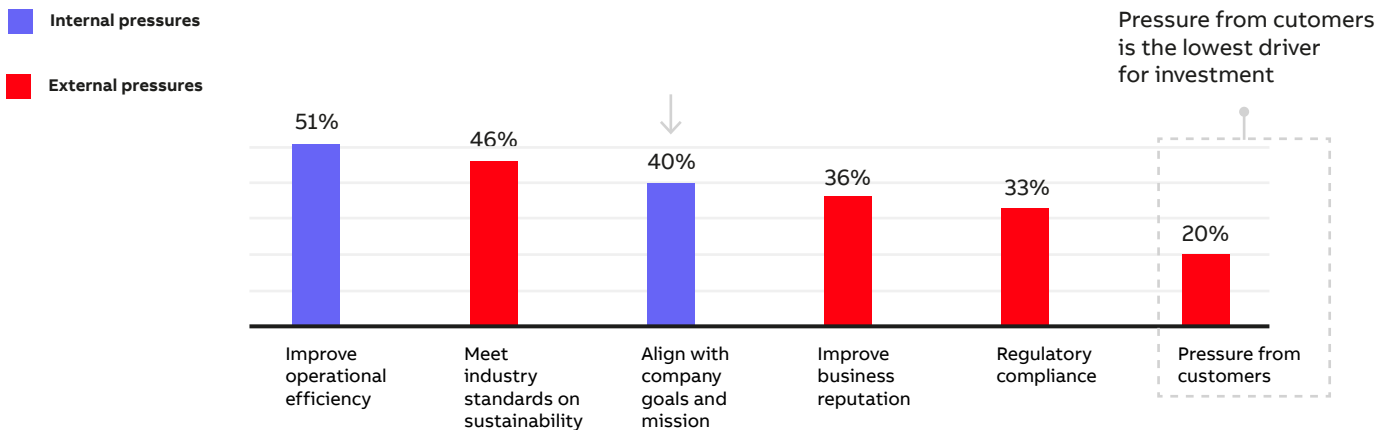
So, for end users, it's not all about cost. But the data shows that it **is** mostly about cost for OEMs. It's intuitive to think that this disparity in thinking ultimately has the potential to cause positive change – standards will get higher and higher, and efficiency demands stemming from the customers' discernment will be made at an increasing pace and scale across the electric motor vertical.

But the drive to market sustainability is ultimately an external pressure. While pressures such as government regulations, market trends, and customer demand are important, internal pressures tend to be more immediate and controllable. External pressures can create a broader context for why energy efficiency is important, but internal pressures often translate directly into actionable decisions and investments.

DRIVERS FOR ENERGY EFFICIENCY



DRIVERS OF INVESTMENT IN MORE SUSTAINABLE MANUFACTURING EQUIPMENT



The data shows that while most businesses are aware of the role the energy efficient motors can play in achieving their sustainability goals, they are more heavily influenced by their own internal commitments and concerns than how they are perceived externally.

This means there is a snag in the supply chain between end users' goals and that of the industrial OEMs, which will only be resolved if

internal pressure can be applied and acted upon. This might take the form of closer collaboration between these different business types, through more transparent data sharing and joint work on Environmental Product Declarations (EPDs). Monetary and marketability strategies should not be in competition with each other, and neither should companies at completely different stages of the supply chain.

Recommendations for market transformation

To fully realise the potential of energy-efficient motor technologies, a coordinated effort across all industry stakeholders is essential. The journey to widespread adoption requires strategic alignment between policymakers, industry leaders, and technology developers. This section outlines actionable recommendations that can drive the market transformation toward sustainable motor solutions.

EDUCATIONAL INITIATIVES AND INDUSTRY COLLABORATION

Raising awareness about the benefits of high-efficiency motors requires targeted educational campaigns. Industry leaders and associations should collaborate to disseminate best practices and share success stories, illustrating the tangible advantages of energy efficient motors. Workshops, seminars, and training programs can equip both decision-makers and technical staff with the

knowledge and tools needed to implement these technologies effectively.

STREAMLINING SPECIFICATION AND INTEGRATION

Rather than sourcing VSDs and motors from separate suppliers, customers should instead invest in integrated single-manufacturer packages that are optimized for efficiency and durability, and engineered to outrun the competition. Packages from one technology supplier make it easier to select, configure, install and service.

Companies looking to invest in new equipment must think beyond finding the cheapest combination of motor and drive. They need to consider the TCO of mixing and matching manufacturers: less reliable operation, lower compatibility, suboptimal servicing, and worse visibility of performance in every metric. If a company wants a winning combination of premium energy efficiency, sustainability, and service, it needs one premium supplier.



CASE STUDY

GSK MAKES THE PERFECT MATCH HUNGARY

GSK upgraded its vaccine manufacturing facility in Gödöllő, Hungary, to improve energy efficiency and support its goal of achieving net zero climate impact by 2030. A key part of this initiative involved replacing lower-efficiency IE1 and IE2 motors in pump applications with ABB's ultra-premium efficiency IE5 SynRM motors, paired with ACH580 variable speed drives.

By sourcing the motors and drives from the same supplier, GSK ensured seamless integration, simplified commissioning, and optimized performance. The upgrade covered 43 pumps across water extraction, pre-treatment, and high-purity water circulation processes, reducing energy consumption significantly. According to GSK's calculations, the investment would pay for itself in approximately two years.

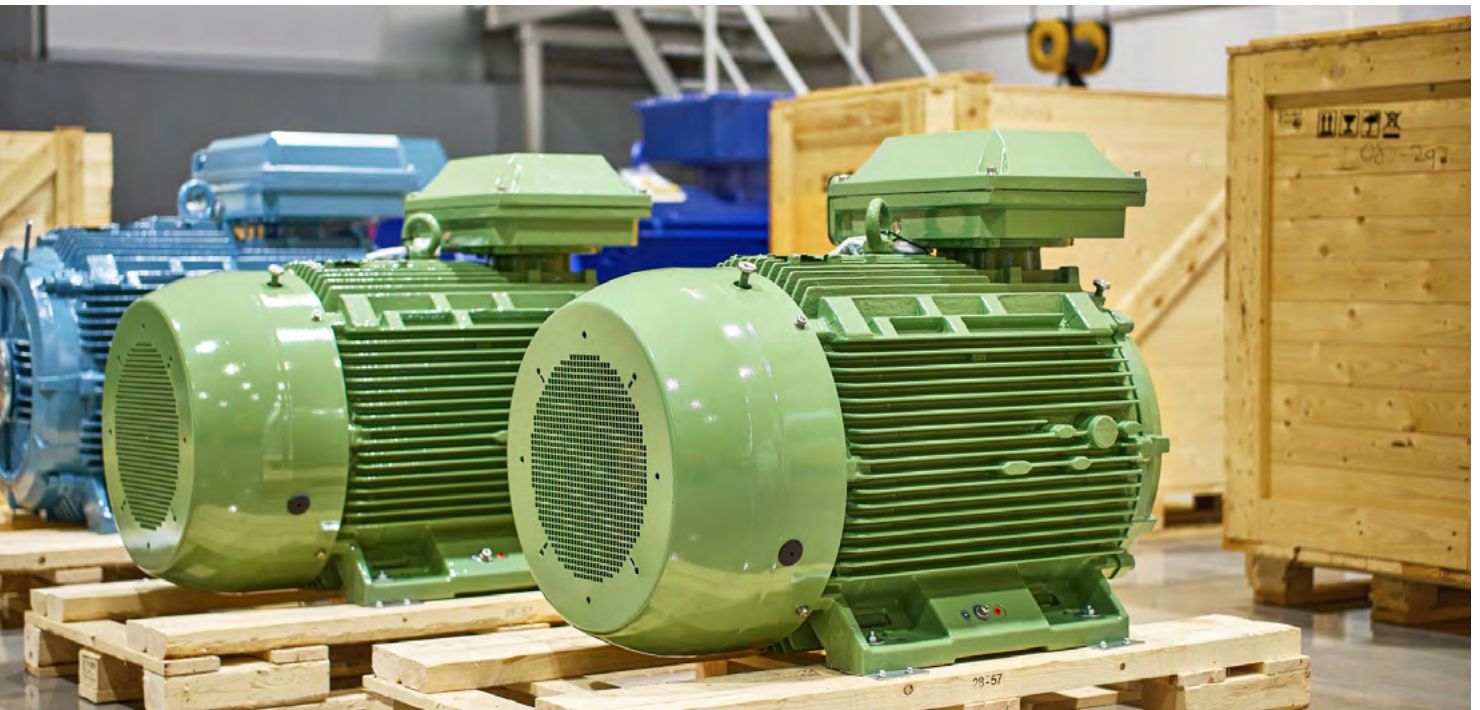
ABB and its local Value Provider, Rakóczi, handled the installation and provided ongoing support. ABB's ACH580 drives, equipped with advanced control features, allowed GSK to transition from inefficient direct-on-line operation to closed-loop pressure control, resulting in energy savings of 20% or more. This precise control ensured that the pumps operated only as needed, enhancing efficiency and reliability. After the successful completion of Phase 1 in early 2024, ABB continued to provide data-driven efficiency reports, helping GSK track energy savings. Encouraged by the results, GSK began planning Phase 2 to upgrade the plant's remaining pumps and ventilation system, further advancing its sustainability objectives.

LEVERAGING DIGITAL TECHNOLOGIES

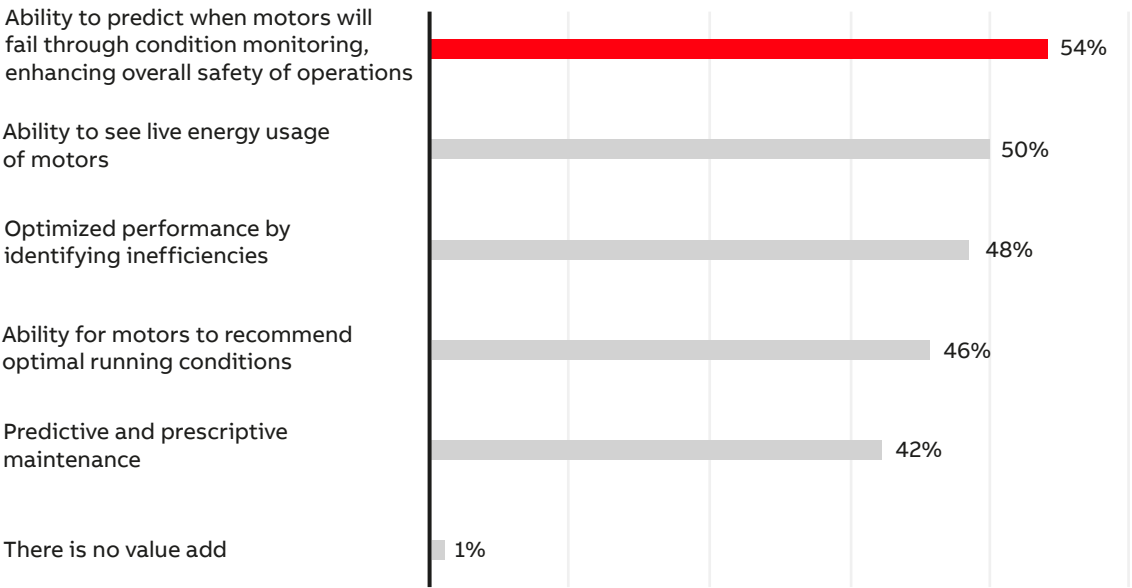
Businesses are being driven by industry 4.0 to increase their investment in innovative technologies and benefit from digitalization. What this investment is being spent on is multifaceted, but there is a focus on automation and AI-driven solutions.

When looking specifically at the digitalization of electric motors, there is a clear trend for electric motor suppliers to utilize data insights and remote monitoring to improve their service offering.

99% of businesses believe there is added value in running digitally connected electric motors, specifically for their capability for predictive condition monitoring to enhance motor availability and safety. **97%** said those objectives could be achieved with AI.

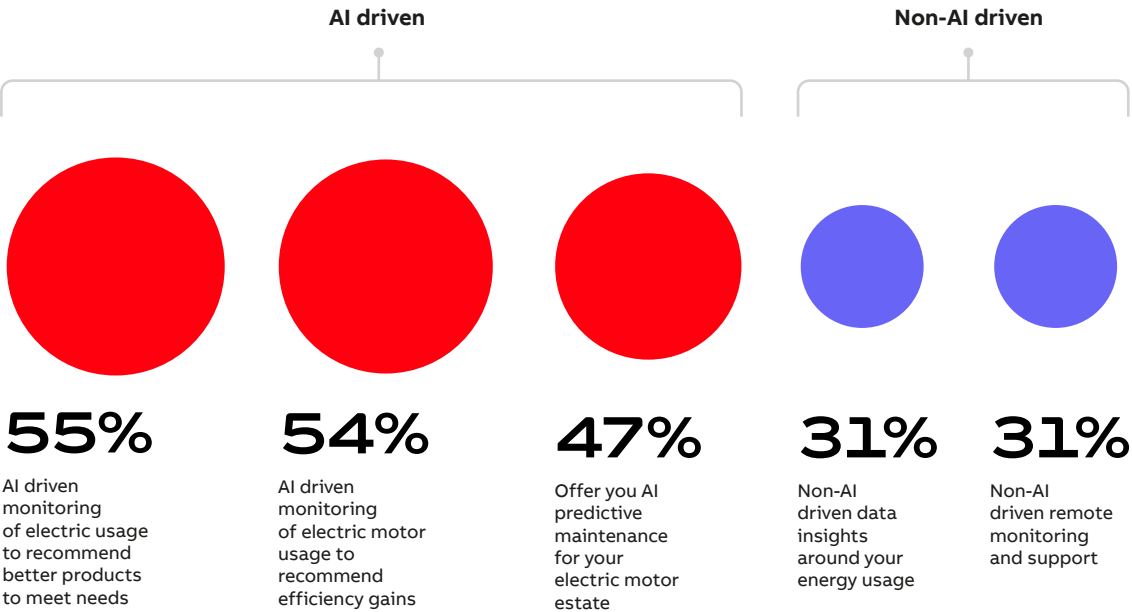


ADDED VALUE OF DIGITALLY CONNECTED ELECTRIC MOTORS



HOW ELECTRIC MOTOR SUPPLIERS COULD USE AI, DATA INSIGHTS AND REMOTE MONITORING

To improve their offering



The integration of digital technologies enhances the appeal and functionality of high-efficiency motors, simplifying the adoption process. By investing in IoT platforms and data analytics, industries can optimize motor performance,

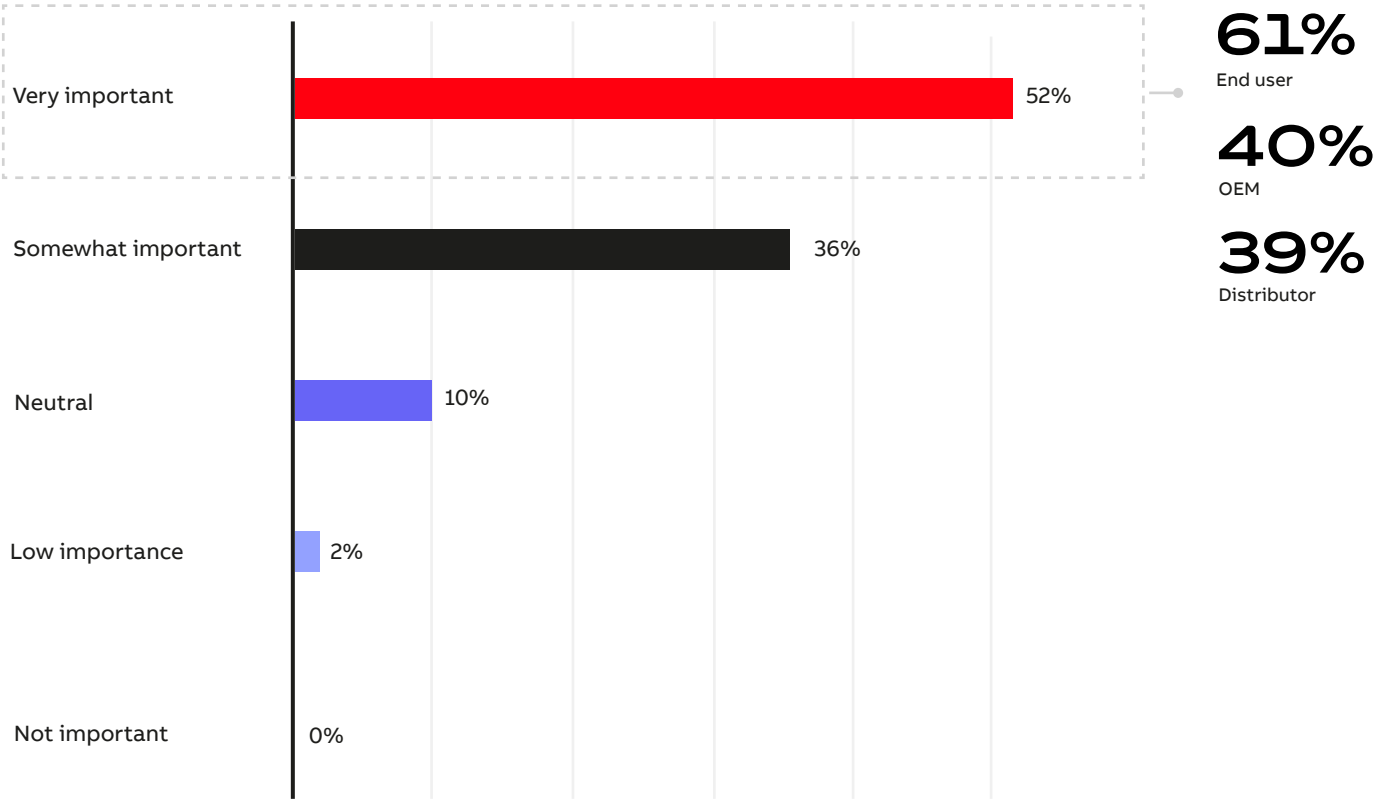
enabling smarter energy management and predictive maintenance. Such enhancements not only offer operational efficiencies but also present a strong business case for transitioning to smarter motor systems.

CONSUMER
ENGAGEMENT AND
TRANSPARENCY

Emphasizing transparency through Environmental Product Declarations (EPDs) can fortify trust among stakeholders and activate market demand. Industries that prioritize transparency and accountability are more likely to build strong relationships with customers who value environmental sustainability.

End user businesses have a direct relationship with end consumers, who increasingly demand transparency about the environmental impact of the products they buy. OEMs and distributors should collaborate with end users on the procurement of EPDs to ensure that the benefits of sustainability are felt from both sales-uplifting and cost-cutting perspectives.

PROVISION OF EPD



The impact of policy and investment

REGULATORY INFLUENCE

By instituting robust energy performance requirements, governments ensure a level playing field where innovation thrives. Policies that reward energy savings, such as energy-efficient grants or tax credits, can significantly reduce the initial financial burden of state-of-the-art technology, or at least assuage the perception of it as too cost-intensive.

Governments can also spearhead the alignment of international standards. IEC and NEMA standards are the two motor standards currently in use around the world – more cross-country alignment on where common energy efficiency standards fit into the picture, and at what pace it will be mandated in each region, would help to drive them forward on a global scale.

INVESTMENT IN INNOVATION

Continued investment in research and development (R&D) is essential for advancing motor technology. Funding initiatives that support breakthroughs in design, material science, and digital integration can accelerate the development of next-generation motors. Simultaneously, investments in infrastructure – such as upgrading grid capabilities and retrofitting industrial facilities – ensure compatibility and facilitate the integration of efficient technologies at scale.

Private sector financial participation is equally important. Businesses investing in new technologies can benefit from reduced operational costs and heightened efficiency, creating a positive feedback loop where savings are reinvested into further innovation.

Environmentally, the shift towards high-efficiency motors means substantial reductions in greenhouse gas emissions and energy consumption. Aligning with ambitious climate targets not only mitigates environmental impact but also positions industries as proactive participants in global efforts to combat climate change.

PUBLIC-PRIVATE PARTNERSHIPS

Public-private partnerships (PPPs) can amplify the impact of policy and investment. By collaborating on innovation hubs and sustainability initiatives, these partnerships allow resources to be effectively pooled and expertise shared, fostering an environment of collective problem-solving and innovation.

In conclusion, the strategic interplay of policy and investment sets the stage for a market transformation. By supporting technological innovation and providing financial incentives, stakeholders can create a resilient industrial framework with energy efficiency as its cornerstone.

Conclusion

The global drive for energy efficiency is gaining momentum, with industrial electric motors at its core. These systems, which power nearly 70% of industrial electricity use, offer an opportunity to cut costs, improve productivity, and reduce emissions. High-efficiency motors, like ABB's IE6 SynRM, go beyond international standards, helping industries achieve significant energy savings while driving operational improvements.

The data reinforces that energy efficiency is now the top consideration for industrial buyers, driven by both economic logic and increasing demand for sustainable operations. VSDs and advanced digital tools, such as predictive maintenance and smart monitoring, further enhance the case for high-efficiency motors by optimizing performance and reducing energy waste.

Energy efficiency isn't just about compliance – it's a strategic priority. Yet challenges remain. Concerns like upfront costs, system integration, and production downtime deter businesses

from investing in IE4 or IE5 motors despite clear evidence of rapid ROI.

A focus on TCO can overcome these barriers, as industries recognize the financial and reputational gains. However, a significant portion of the market is still focused on short-term costs. Further education about the long-term benefits of energy efficiency, exemplified in the work currently being done by associations like the [Energy Efficiency Movement](#), as well as closer collaboration between end users and OEMs about financial- and brand-related sustainability objectives, will help to further the TCO mindset as the overwhelming norm.

This is more than a regulatory necessity – it's a step toward sustainable industrial growth. By acting decisively, sector leaders can align business goals with global climate objectives to make their respective corners of the industry more energy efficient than ever.

Methodology

The insights and conclusions articulated within this whitepaper are founded on meticulous research and industry collaboration, spearheaded through our partnership with Sapio Research. The methodology was designed to capture a comprehensive snapshot of current attitudes, challenges, and trends regarding energy efficiency and sustainability in industrial operations.

Respondents came from more than 13 countries in varied geographical regions across Europe, the Americas, and Asia. This broad reach ensured a diverse sample, reflecting differing industry conditions and priorities.

The survey examined critical insights related to energy efficiency priorities, investment trajectories, digital integration, and barriers to adopting high-efficiency motor technologies.

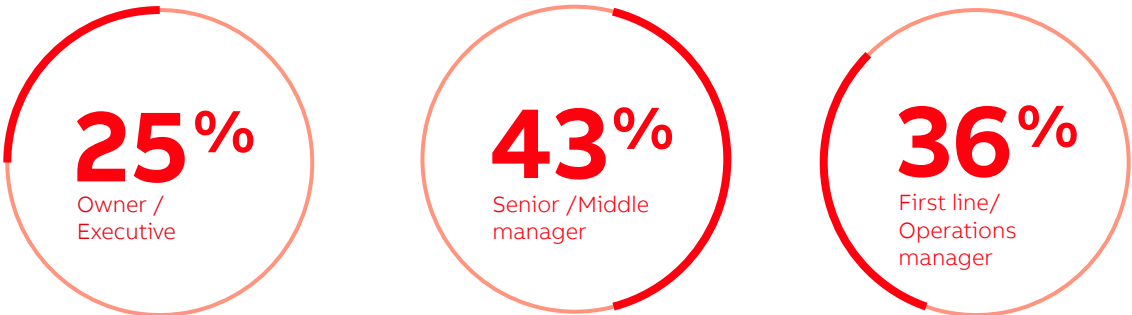
Sapio Research employed stringent data collection and analysis methods to ensure findings were both accurate and actionable, providing a robust foundation for the whitepaper's strategic recommendations.

Collaboration with ABB allowed for the integration of expert insights, aligning survey results with industry-specific applications and innovations in motor technology. This approach supported a nuanced understanding, equipping stakeholders with comprehensive information to address the evolving landscape of energy efficiency.

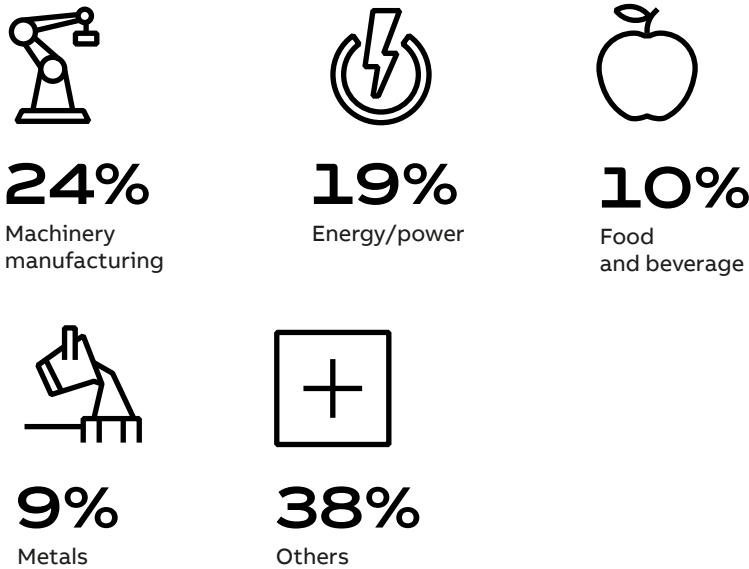
Together, these insights and methodologies offer a roadmap to drive meaningful change and capitalize on the potential of sustainable motor technologies.

DATA WAS COLLECTED VIA A DETAILED SURVEY

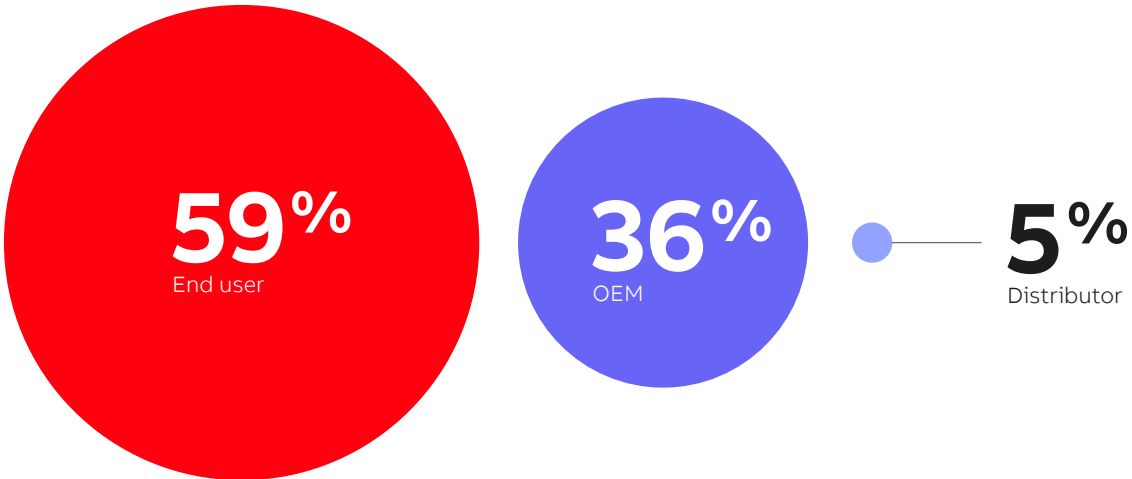
Conducted in 2024, targeting 2,395 decision-makers



FROM KEY INDUSTRIES



OF THREE DIFFERENT TYPES



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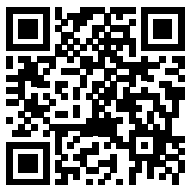
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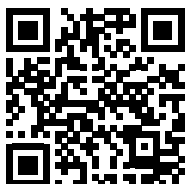
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